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AUTHOR Anderson, Ruth; And Others
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ABSTRACT

To examine the relationship between reflection-impulsivity and creativity in hearing impaired and unimpaired elementary children, 26 hearing impaired and 16 hearing children (8-13 years old) were administered the Matching Familiar Figures Test and the Torrance Tests of Creative Thinking. Correlation coefficients were calculated to examine the relationship between four reflection-impulsivity scores (total number of errors, average response latency, impulsivity, and efficiency) and four creativity dimensions (fluency, flexibility, elaboration, originality). For hearing children, as expected, more impulsive responding was generally associated with greater creativity. However, no significant relationships between creativity and impulsivity were found for the deaf Ss. Results suggested that these cognitive skills may develop in different patterns and rates for hearing impaired children. (CL)

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Reflection-Impulsivity and Creativity

in

Deaf and Hearing Children

Ruth Anderson
Kent State University

David S. Glenwick
Fordham University

Stephen R. Levin
Kent State University

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The present study was designed to assess the relationship between reflection-impulsivity and creativity in hearing impaired and unimpaired elementary school children.

Reflection-impulsivity refers to a person's typical problem-solving strategy when presented with a problem for which there are several possible alternative responses and a high degree of uncertainty as to which solution is most correct. A task typically used to measure reflection-impulsivity is the Matching Familiar Figures Test. By definition, a child who is more reflective will tend to make relatively few errors on this task but will exhibit longer response latencies. In contrast, the more impulsive child tends to respond faster but is more error-prone.

A substantial amount of research has examined the cognitive and behavioral correlates of reflection-impulsivity. Children who are more reflective have generally been found to be more cognitively and intellectually advanced and successful than impulsive children. More reflective children have generally been found to possess higher achievement motivation and higher reading ability. Impulsivity is associated with lower performance on tests of intellectual ability and educational achievement. Impulsivity also appears to be positively correlated with hyperactivity and poor motor control.

Although many researchers have studied reflection-impulsivity and its correlates in children with normal hearing, few have studied this dimension in hearing impaired children. A substantial theoretical literature has discussed the interrelationship between impulse control and language development.

Some theorists have proposed that the ability to delay and control impulses precedes the development of thought. Others have held that verbal language serves a mediating function between thought and behavior, enabling a child to anticipate consequences and inhibit action.

The study of impulse control in moderately to profoundly deaf children has generally been conducted through the use of clinical impressions. These observations have suggested that deaf children have a shorter attention span, greater hyperactivity, and poorer impulse control than their hearing counterparts.

Other studies have used a variety of standardized measures to assess the degree of impulsivity among hearing impaired children. The majority of this research also indicates that hearing impaired children exhibit poor impulse control relative to their hearing peers.

Although a reflective cognitive style is advantageous in some situations, Wright and Vliestra (1977) suggest that an impulsive style may facilitate performance on less analytic tasks and in situations where associational cognitive processes are used and judgment is deferred. More specifically, an impulsive style may be preferable when task demands require divergent cognitive processes such as brainstorming, free associating, estimating, guessing, and arriving at alternative solutions to problems. According to this hypothesis, it would be expected that impulsive children would perform better than reflective ones on tasks requiring divergent or creative thinking.

Research to date has not borne out this suggestion. However, the studies relating creativity and reflection-impulsivity have tended to sample a limited range of creative behaviors and to employ a median split to classify subjects as reflective or impulsive. A median split leads to the elimination of subjects and a lack of generalizability across studies.

Addressing these methodological inadequacies, the present study investigated the relationship between reflection-impulsivity and creativity in hearing children and deaf children. It was hypothesized that in both samples the more impulsive youngsters would perform better on the creativity measures.

The subjects consisted of a) 26 hearing impaired children (13 males, 13 females) with a hearing loss of at least 70 decibels and an IQ of at least 80, and b) 26 hearing children, also possessing an IQ of at least 80. Hearing impaired and unimpaired children were matched on sex and age (within nine months). Subjects ranged in age from 8 to 13 years. All children were Caucasian. The majority of the hearing impaired children attended small special education classes in which oral communication was used (n=19) and the remainder (n=7) attended special education classrooms employing total communication. Virtually all of the hearing impaired subjects were prelingually deaf and evidenced deficits in language development.

The children were tested inthe school setting during regular school hours. Each subject attended one small-group session and one individual testing session. Sessions

took place on two separate days within a two-week time period. During the group session, the children were administered the figural tests of the Torrance Tests of Creative Thinking. The second session consisted of an individual administration of the Matching Familiar Figures Test. The order of administration of these two tests was randomly varied.

Instructions for these measures were given to the hearing impaired subjects with the assistance of teachers or teachers' aides. Oral communication or signing was used according to the teaching method employed in each child's respective classroom. Pilot work indicated that the degree of verbal knowledge and skill required to comprehend the instructions of the creativity measure exceeded the repetoire of the deaf children. Consequently, instructions for the Torrance Tests were modified for all subjects to ensure their comprehensibility to the hearing impaired children.

To control for the influence of intelligence, recent IQ test scores were obtained from the children's academic files.

The Torrance Tests of Creative Thinking were designed to measure a spectrum of creative thinking abilities. The tests are organized into both verbal and figural batteries in two alternate forms. The Torrance Tests are scored across subtests on four dimensions of creative thinking. These include: a) fluency, the capacity to produce a quantity of ideas; b) flexibility, the ability to produce a variety of different types of ideas; c) originality, the capacity to

produce unusual or unconventional responses; and d) elaboration, the ability to embellish or elaborate upon ideas.

The figural tests, Form A, were administered in this study. These consist of three 10-minute tests: Picture Construction, Picture Completion, and Lines.

The Matching Familiar Figures Test or MFF is a measure of the cognitive style dimension of reflection-impulsivity and consists of 12 match-to-sample items. Each item consists of one sample drawing and six alternative drawings, one of which is identical to the sample. The child is instructed to point to the one drawing that is an exact duplicate of the sample drawing. Each of the 12 items is presented until the child either points to the correct response or makes six errors. The next item is then presented. The child's response latency on the first trial of each item is recorded, as is the munber of errors per item. Two scores are obtained upon completion of the MFF a) total number of errors and b) average response latency to the items. Two composite scores, impulsivity and efficiency, were derived by combining z-score transformations of MFF latency and error scores.

Correlation coefficients were calculated to explore the relationship between the four reflection-impulsivity scores and the four creativity dimensions (See Table).

For the hearing subjects, numerous significant relationships in the expected direction were found. MFF errors were positively correlated with fluency and flexibility. MFF latnecy was negatively related to fluency, flexibility, and originality.

Impulsivity was positively correlated with fluency, flexibility, and originality. Efficiency was negatively related to originality and elaboration. These results were generally maintained after partial correlations were conducted to control for IQ effects.

For the deaf children, however, no significant relationships between impulsivity and creativity were found.

No significant differences between the hearing and deaf children on any of the impulsivity and creativity variables were found.

The hypothesis that impulsivity would be associated with greater creativity was partially confirmed. For the hearing children, more impulsive responding was generally associated with greater creativity. More impulsive responding was associated with the generation of a larger quantity of ideas, flexible thinking incorporating a greater variety of ideas, and more unique and original responses. This finding supports Wright and Vlietstra's (1977) hypothesis that an impulsive cognitive style may be preferable to a reflective one when task demands require associational or divergent cognitive processes.

Efficiency was also associated with greater creativity among the hearing children. Efficient information processing fostered both the production of more original or unusual responses and the further development of those ideas. As both impulsive and efficient problem-solving strategies were associated with greater creativity for hearing children, this suggests that a rapid pace of information processing

and responding may facilitate performance on some types of creativity tasks.

In contrast to the findings for the unimpaired children, no significant relationships were found between MFF performance and creativity for the hearing impaired children. The general failure to uncover significant relationships between creativity and impulsivity for the hearing impaired children suggests that these cognitive skills may develop at different rates and in a different pattern for the hearing impaired than for the unimpaired.

The findings of the present study support the hypothesis that, at least among hearing children, an impulsive cognitive style is advantageous on tasks requiring brainstorming or divergent thinking processes. This implies that teaching methods should strive to promote cognitive flexibility among children. Instead of attempting to replace an impulsive style with a reflective one, children may be taught to differentially apply impulsive or reflective styles according to the demands of the particular situation. The fact that an impulsive style was found to be advantageous in situations requiring creative thinking reflects a need for a more balanced view of the advantages and disadvantages of an impulsive cognitive style.

Table 1

Correlation Coefficients between Reflection/Impulsivity and Creativity Measures in Hearing Children

	Fluency	Flexibility	Originality	Elaboration
MFF Errors	.41*	.42*	.25	-.19
MFF Latency	-.43*	-.44*	-.48**	-.14
Impulsivity	.47**	.48**	.44*	.02
Efficiency	-.27	-.27	-.41*	-.34*

Note. $N = 26$.

* $p < .05$

** $p < .01$